

REMARKS

The Office Action dated March 4, 2003 has been carefully considered. Claims 1, 2 and 4-7 directed to a nonelected invention have been cancelled. Claims 3, 9, 12 and 13 have been amended. Claim 16 has been added. Claims 3 and 8-16 are in this application.

The Examiner indicated that applicants have not complied with one or more conditions for receiving the benefit of the earlier filing date under 35 USC §120. Applicants have added a specific reference to the parent application in the first sentence of the present application.

The Abstract was objected to because it was not of one paragraph of proper length. The Abstract of the Disclosure has been amended to be one paragraph of proper length.

Claim 3 was objected to as including a grammatically awkward phrase of "as held in contact with metal". The term "as held" has been cancelled.

Claims 3, 8 and 10-15 were rejected under 35 USC §112 as incomplete for omitting essential elements. Applicants have added the element of the water content to obviate the Examiner's rejection. Support for the amendment is found throughout the specification and in particular on page 4, lines 15-18 and page 12, lines 20-22 of the present application. No new matter has been entered.

Claim 13 was rejected under 35 USC §112 as containing subject matter not described in the specification to enable one to make and/or use the invention. Applicants have amended claim 13 to recite the concentration of N-phenyl maleimide is relative to that of the acrylonitrile solution of N-phenyl maleimide.

The previously presented claims were rejected under 35 USC §102(a) as being anticipated by JP08-092208 to Kishino et al. Applicants submit that Kishino et al. is not prior art to the present application because it was published April 9, 1996 which is after the claimed priority date of August 29, 1995 of the JP application 7-220072. Applicants submit that the present application is an English translation of JP 7-220072 as referenced by the attached Declaration of Nobuko Saito.

The previously presented claims 8, 10 and 11 were rejected under 35 USC §103(a) as obvious in view of Kishino et al. in combination with EP 333244 ('244) to Kita et al.

EP '244 discloses only a method for prevention of polymerization and turbidity in the acrylonitrile solution of maleimides by controlling an acid content of the maleimides to a specific amount (not more than 0.3%) in acrylonitrile. The purpose of this invention is to prevent the "discoloration" of acrylonitrile solutions of maleimides, the "discoloration" is defined, as changing color from inherent yellow color to a brown color.

In contrast to the invention defined by the present claims, Kita et al. EP '244 do not teach or suggest a method for storage of an acrylonitrile solution for prevention of coloration of the acrylonitrile solution. To the contrary, Kita et al. EP '244 teach only prevention of polymerization and turbidity which is an unrelated technical field. Further, Kita et al. EP '244 does not teach or suggest storage of an acrylonitrile solution of N-phenyl maleimide, which, in a forced coloration test, the values, ΔL , Δa , Δb , are calculated in accordance with the following formulas:

$$\begin{aligned}\Delta L &= |L1-L2| \text{ (Absolute value)} \\ \Delta a &= |a1-a2| \text{ (Absolute value)} \\ \Delta b &= |b1-b2| \text{ (Absolute value)}\end{aligned}$$

wherein L1, a1, and b1 are respectively the values of L, a, and b of the acrylonitrile solution before undergoing the forced coloration test and L2, a2, and b2, are respectively the values of L, a, and b of the acrylonitrile solution after undergoing the forced coloration test and are respectively 5 or less, 5 or less and 10 or less, wherein a molecular oxygen concentration of the gaseous phase portion of the solution is adjusted to a level in the range of 0.01 to 10% by volume preparatorily to storing the solution. Further still, Kita et al. EP '244 do not teach or suggest a water content of not more than 0.1% by weight, as defined by the present claims. Accordingly, the invention defined by the present claims is not taught or suggested in Kita et al. EP '244 and the invention defined by the present claims is not obvious in view of Kita et al. EP '244. As noted above Kishino et al. is not a prior art to the present application.

The previously presented claims 3, 8, 10, 11 and 13-15 were rejected under 35 USC §103 as obvious in view of Kita EP '244 in combination with U.S. Patent No. 5,149,827 to Kita et al. (Kita '827).

Kita '827 teaches a method for handling maleimide which comprises handling the maleimide in the presence of a stabilizer at a temperature exceeding the melting point thereof in a state kept in contact with a gas phase having a molecular oxygen content of not more than 12% by volume. Thus, Kita '827 relates to handling maleimides in a molten state in the presence of a polymerization inhibitor.

In contrast to the invention defined by the present claims, Kita '827 does not teach or suggest storage of an acrylonitrile solution of N-phenyl maleimide. Rather, Kita '827 is only related to a molten state of maleimide. The color mechanism of Kita '827 is related to an observation that when the concentration of oxygen in the gas phase is high the maleimide is apt to colorization. Accordingly, in Kita '827 the molecular oxygen content is kept below the level of 10% for preventing discolorization. In contrast, it has been found in this invention that in the acrylonitrile solution the substances responsible for the discoloration, are azobenzene and N, N¹-diphenyl hydrazine which are formed by hydrolysis of maleimides by water contained in the acrylonitrile solution of maleimides, see page 6, line 21-page 7, line 20 of the present application. Accordingly, the discolorization mechanism of Kita '827 is substantially different from the discolorization mechanism of the present invention. Accordingly, Kita '827 which only disclosed a handling for prevention of polymerization in acrylonitrile solution of maleimides does not cure the deficiencies of Kita et al. EP '244 noted above and the present invention is not obvious in view of Kita et al. EP '244 in combination with Kita '827.

The previously present claims 9 and 12 were rejected under 35 USC §103 as obvious in view of Kita '244 in combination with Kita '827 and JP 06-128223 to Ueda et al.


Ueda et al. relates to a method for inhibiting coloration and transportation or storage of N-alkyl maleimide by decreasing the water content to 0.5 weight % or less. Further, Ueda et al. disclose that the reason for coloration is not based on changing N-alkyl maleimide compound itself, but water contained in N-alkyl maleimide causes hydrolysis gradually and colored material formed by the hydrolysis causes coloration of N-alkyl maleimide compound. Therefore, coloration can be suppressed by controlling the water content in N-alkyl maleimide in an appropriate range. However, Ueda et al. only disclose neat N-alkyl maleimide, but do not disclose any solution states which comprise maleimide and solvents, and do not disclose any

additive such as antioxidants.

In contrast to the invention defined by the present claims, Ueda et al. do not teach or suggest a method for storage of an acrylonitrile solution of N-phenyl maleimide as defined by the present claims. Rather, Ueda et al. only teach a coloring prevention method for N-alkyl maleimide. Applicants submit that inhibition of N-phenyl maleimide is more difficult than a solution of N-alkyl maleimide because the product formed in the present invention by hydrolization automatically contains the phenyl group, so colorization is much more remarkable. Further, Ueda et al. do not teach or suggest controlling the range of values of ΔL , Δa , Δb , of the forced colorization test in the specific range of acrylonitrile solution of N-phenyl maleimide, as defined by the present claims. Further still, Ueda et al. do not teach or suggest the use of antioxidants of at least one member selected from alkyl-substituted hydroxybenzenes, hindered phenols, phosphorous esters, phosphoric esters, and phosphoric acid amides as defined in amended claim 9. Accordingly, the teachings of Ueda et al. do not cure the deficiencies of Kita et al. EP '244 or Kita '827 and the present invention is not obvious in view of Kita et al. EP '244 in combination with Kita '827 and Ueda et al.

In view of the foregoing, Applicants submit that all pending claims are in condition for allowance and request that all claims be allowed. The Examiner is invited to contact the undersigned should he believe that this would expedite prosecution of this application. A fee in the amount of \$930.00 for a 3-month extension of time is enclosed. The Commissioner is authorized to charge any deficiency or credit any overpayment to Deposit Account No. 13-2165.

Respectfully submitted,



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